

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE
STATE OF HAWAII

In the Matter of

PUBLIC UTILITIES COMMISSION

Instituting a Proceeding to Investigate the
Implementation Of Feed-in Tariffs.

DOCKET NO. 2008-0273

PUBLIC UTILITIES
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**CLEAN ENERGY MAUI'S FINAL STATEMENT OF
POSITION AND PROPOSED FEED-IN TARIFF**

AND

CERTIFICATE OF SERVICE

CLEAN ENERGY MAUI LLC

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**CLEAN ENERGY MAUI LLC'S FINAL STATEMENT OF
POSITION AND PROPOSED FEED-IN TARIFF**

Clean Energy Maui LLC ("CEM") hereby submits its Final Statement of Position ("SOP") and Proposed Feed-In Tariff ("Proposed FIT").¹

Clean Energy Maui LLC joins Blue Planet Foundation's Statement of Position and Zero Emission LLC's proposed Feed-in Tariff and submits the following additional information. To conserve resources, Blue Planet Foundation's Statement of Position and Zero Emission LLC's proposed Feed-in Tariff are not reprinted inside this Statement of Position.

Two central questions have been consistently outside the area of discussion and seem to hardly enter the minds of the negotiators.

a) With Hawaii losing it's beaches and tourist trade in the coming decades to global warming, should Hawaii not be at the forefront of combating climate change?

Hawaii emits more carbon dioxide than 112 countries and the per-person emissions (including flight traffic) are the highest in the world. The FIT is the world standard of renewable energy legislation and by far the most successful policy to create investment in renewable energy and

¹ CEM's SOP is timely filed in accordance with the March 30, 2009 deadline established by the "Order Approving the HECO Companies' Proposed Procedural Order, As Modified" issued by the State of Hawaii Public Utilities Commission ("Commission") on January 20, 2009 ("Procedural Order"). *Id.* at 12.

curb carbon emissions. The eyes of the U.S and the entire world are on Hawaii's FIT deliberations. As the first state in the U.S. to define a FIT, the outcome of this docket will set a signal to other states and countries. This signal, which should be the adoption of a full FIT according to the German example, will encourage other states' PUCs to follow the example and make renewable energy a priority. If, however, the Hawaii PUC adopts the Heco minimalist proposal, it will signal to the world that Hawaii and the U.S. are not ready to lead the world's response to climate change.

b) Can Hawaii afford to pay as much as \$7.5 billion per year to oil countries?

Probably not. With a shaky economy and declining tourism, Hawaii needs to sharply reduce the outflow of money and use it instead to mine the abundant resources of free renewable energy. Heco is earning less than 5% on every dollar pumped abroad, whereas a dollar spent inside Hawaii re-cycles 3-5 times. We cannot afford to forego \$10-20 billion of productive investments into clean energy installations in Hawaii that could result from a well-designed FIT.

Additions to answers given to the PUC according to the procedural order:

8. What renewable energy projects should be eligible for which renewable electricity purchase methods or individual tariffs and when?

In addition to the technologies proposed in Blue Planet's SOP, we recommend that the commission considers:

- a) a low-cost generic FIT rate for any firm renewable energy with no caps. This will allow new technologies to enter the marketplace right away. The rate should be set equal to the

lowest rate for any firm renewable energy in the FIT schedule. The technical specifications need to impose increased participation of the resource in grid management for larger installations.

- b) a FIT rate for grid-stabilizing technologies, such as batteries, demand control and ancillary power. We are watching the German deliberations on such a tariff and will report on the definition of their FIT rate in the following weeks. The reason to include such a rate is that there is a large amount of investment needed to stabilize intermittent wind and solar energy, but there is no money for it. This FIT rate would generate investment capital both for developers and inside the utility to make these needed investments.

10. Should the commission impose caps based upon these financial effects, technical limitations or other reasons on the total amount purchased through any mechanism or tariff?

Clean Energy Maui believes that it is clear that financial effects are very small and that over the 20-year period of a FIT would become extremely positive.

The only reasons to limit the amount of renewable energy are:

- 1) technical limitations
- 2) exceeding consumer demand

At this point we are not concerned with point 2, but it will become an issue in the future.

Heco and many other power companies around the world have argued technical limitations as a defense against renewable energies. Such limitations have been brought forward at each opportunity since 30 years, but they never get resolved. Studies come and go, but there are other, stronger issues hidden underneath the technical limitations argument.

We will examine these first and then get deeper into the technical discussion:

1) Technical limitations are a too-convenient argument against renewable energies. Since it is hard to disprove them (these are classified, internal issues of the company), they often get accepted by regulators. However, in those cases where they did not get easily accepted, they changed shape into technical challenges that good engineers were eager to solve. As such solutions become patentable and sellable technologies, they will provide additional income streams for the utility and all involved. We strongly suggest to the PUC to resist the technical limitations argument. Motivating power companies to overcome their own inertia requires a lot of political will and it is therefore rarely seen in the world. Political will, as noticed by Al Gore, is a renewable resource.

2) Technical limitations must be temporary by definition. Looking 100 years into the future, clearly our energy will come from other sources than oil. Looking 80 years ahead, that will probably still hold true. 60 years ahead, yes, you will find many experts that believe that oil won't last that long. 40 years? Well, after several oil wars, shortages and price explosions, there will be a big resistance to using oil. 20 years ahead? Well, that's anybody's guess.

The result of this mental exercise is that technical limitations are limited to the next 20 to 40 years. They will be solved at some point in time, so why not now.

3) Technical limitations have been overcome elsewhere. The island of Bonaire is installing a combination of wind power, biodiesel generators and batteries that aim to have a 100% renewable penetration. This means, that when the wind blows the island will run entirely on wind power. The biodiesel generators will make up for the remainder when there is not enough wind and the batteries are used to stabilize the grid. Mecor at the present time is achieving only a 15% penetration. Clearly, there are solutions available.

4) Technical limitations are really cost limitations. If Heco would install a huge battery, it could absorb all and any variations from wind and solar energy. To the extent that Heco is not investing in grid-stabilizing improvements, technical limitations show up. If the commission would set a certain level of renewable energy penetration, investments would be made and the problem would be solved. A FIT rate for grid-stabilizing technologies, as proposed above under (8) would help to generate the funding needed inside the utilities and for the developers.

5) Technical limitations can be shifted to developers. Currently the wind developers lay the burden of energy stabilization on the utility. In Germany we see new technical specifications that demand large windfarms to install capacitor banks to smoothen their energy. This is paid for by an slightly increased FIT rate and no problem for either party.

6) Technical limitations assume that renewable energy gets integrated into the existing energy structure. However, this is only true in the beginning. The necessary investments for renewable energy dwarf the existing infrastructure. For the State of Hawaii we will see \$15-20 billion in renewable energy systems investments. Heco's generation side is worth less than \$1 billion. Soon, the real task is to design a complete energy system running on renewable energies. Whether or not the legacy generators will find a place in such a system remains to be seen and is of minor importance. If \$15-20 billion seems like an extraordinarily large sum, it's good to understand that Hawaii's utilities will be spending the same amount for foreign oil in the next 6-10 years without getting the benefit of all that investment and construction.

6) Technical limitations being put forward could raise a doubt in the competency of Heco to usher in an age of renewable energies. Obviously there is an under-investment inside Heco to solve these problems both in the personnel sector and in the grid improvements. This raises the possibility of assigning the task of generating and integrating renewable energy to a new entity.

7) Technical limitations can be outsourced. In the above mentioned example of Bonaire the government ordered a complete replacement of the existing generating station with a 100% renewable energy system. It was entirely built by a foreign consortium. If we would extrapolate the cost of that system to Maui's size, it would cost only as much as Meco spends in 3 years on oil. After the initial years, ratepayer's cost would drop dramatically.

Technical discussion

Renewable energies come in two types, firm and intermittent. For this discussion we will focus on the short-term intermittency only, as it appears in wind and solar systems. All other energies are considered firm, even if for example hydro power may not function for parts of the year.

1. Integration of firm renewable power

There are no difficulties with the integration of firm power into the grid until they reach a high percentage of the energy production. As they become prevalent and substitute conventional generators, larger renewable installations need to participate with grid management and need to be able to perform the demand-following and frequency-stabilizing functions of the displaced generators. Firm renewable power that varies at longer intervals needs to be backed up by other generators, but that's not different from conventional generators going into maintenance.

2. Integration of intermittent renewable solar power

The advantage of having distributed solar power in small and mid-size configurations is that they tend to balance each other out. As long as the systems get deployed in various parts of each island, there is no chance that a cloud suddenly would block them all. Variations are much less radical than in large central solar plants. In addition, CSP technology and battery-enhanced PV systems smoothen the power output sufficiently that the utilities' diesel generators can follow the slower changes.

3. Integration of intermittent renewable wind power

Wind farms create large grid fluctuations because they are concentrating energy production in small geographic areas and the energy in wind is the cube of wind speed, i.e. small changes in wind speed generate large changes in energy output. This is the governing reason to employ multiple wind farms in different regions, so that they can smoothen each other's variations out since wind speeds would change simultaneously all over the map. By best estimates, the total

amount of wind power in Hawaii that can be used without massive storage is 400-700 MW. With a power factor of 35%, and some (paid) curtailment, this would contribute as much energy as a 100-200 MW conventional power plant. The electrification of the transport sector, with it's massive cumulative storage will increase allowable wind power considerably.

DATED: Kihei, Hawaii, March 28, 2009.

A handwritten signature in blue ink, appearing to read "C. Mentzel", is written over a horizontal line.

CHRIS MENTZEL
CEO, Clean Energy Maui LLC

CERTIFICATE OF SERVICE

I hereby certify that I have this date filed and served the original and eight copies of the foregoing **CLEAN ENERGY MAUI'S FINAL STATEMENT OF POSITION AND PROPOSED FEED-IN TARIFF** in Docket No. 2008-0273, by mail delivery to the Commission at the following address:

CARLITO CALIBOSO
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I hereby further certify that I have this date served two copies upon the following party of the foregoing **CLEAN ENERGY MAUI'S FINAL STATEMENT OF POSITION AND PROPOSED FEED-IN TARIFF** in Docket No. 2008-0273, by mail addressed to:

CATHERINE P. AWAKUNI
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I hereby further certify that I have this date served one copy upon each of the following parties, of the foregoing **CLEAN ENERGY MAUI'S FINAL STATEMENT OF POSITION AND PROPOSED FEED-IN TARIFF** in Docket No. 2008-0273, by causing each such copy thereof to be sent via e-mail in a portable document format ("pdf") to each such party as follows:

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DATED: Kihei, Hawaii, March 28, 2009


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